

WINTER PRE-SCHOOL IN-CLASS ACTIVITY 2000
"EXPLORING THE WORLD OF SNOWFLAKES AND TRACKS"
CONCEPT: AWARENESS AND SENSITIVITY
TIME: 40 MINUTES

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson students will be able to:

1. State that not all snowflakes and animal tracks in the snow are alike, based on their observation. (Reflecting on Scientific Knowledge #3)

2. Immitate movement of animals making tracks in the snow. (Reflecting on Scientific Knowledge #2)

Thinking Skills: making analogies, compare/contrast

Introduce self as ranger. What's a ranger do? Thanks for the invitation, introduce National Park idea and shoulder patch, here to help them understand things find in a national park or by their home - snow and animal tracks!

1. Distribute copies of snowflake sheets. Have kids find the two snowflakes that look alike! Explain that not all snowflakes are alike!

2. Distribute hand lenses and show them how to use them to look at things up close. Practice by having them look at their own finger prints. Next distribute snowflakes preserved in petri dishes and snowflake charts. Have them find the picture on the chart that looks like their snowflake.

3. Show students stuffed animals and let them touch them. Explain that when they walk in the snow, the animals feet leave behind tracks. Bring in tray of snow. Demonstrate how foot prints of stuffed animal would leave a track.

4. Show students rubber animal tracks on block of wood. Bring in more trays of snow and let kids make their own animal tracks in the snow with rubber prints. Explain what the tracks are and how bigger animals make bigger tracks. Show them pictures of animals and what their track looks like.

5. Explain that how an animal walks or runs determine what its tracks looks like. Immitate how a snowshoe hare walks and draw a picture for the kids to see. Have each student demonstrate the movement of a hare to make its tracks. Next demonstrate the fox and have the kids immitate the fox movement.

Thank them for their attention and challenge them to be on the lookout for different snowflakes and tracks wherever they travel this winter!

MATERIALS NEEDED:

-snowflake handouts, mounted animal specimens: fox, squirrel and snowshoe feet, track sheet showing fox and hare tracks, hand lenses, snowflake charts, snowflake lenses, snowflakes in petri dishes, trays of snow, animal pictures, rubber animal block tracks, tarp to put snow trays on.

WINTER PRE-SCHOOL FIELD ACTIVITY 2000
(At School Site or National Lakeshore)
"EXPLORING THE WORLD OF SNOWFLAKES AND TRACKS"
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2. Imitate movement of animals making tracks in the snow. (Reflecting on Scientific Knowledge #2)

Thinking Skills: making analogies, compare/contrast

Introduce self. Do they remember what rangers do? Do they remember what park I work for? Explain today they will become scientists to learn more about snow by catching some and looking at them with their lenses. They will also make tracks of the hare and fox in the snow, then look for other animal tracks.

1. Review use of hand lenses.

2. Outside show snowflake catchers and explain how to use.

Distribute charts for them to make their flakes to.

3. Show kids how to make hare and fox tracks. Have kids do same.

4. Distribute animal tracks card and look for other animal tracks.

5. Hike to Munising Falls or the Sand Point Boardwalk trail to explore snow and tracks!

Thank them for being such good science explorers. Challenge them to be on the lookout for different snowflakes and tracks wherever they travel this winter!

Materials Needed:

-hand lenses

-snowflake charts

-laminated track sheets

-snowflake catchers

WINTER KINDERGARTEN IN-CLASS ACTIVITY 2000
"EXPLORING SIGNS OF WINTER"
CONCEPTS: AWARENESS, AND MATTER
TIME: 40 MINUTES

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Predict and describe the change in matter from ice and snow into water. (Changes in Matter #1)
2. Use a thermometer to take temperature of melting snow and ice. (Constructing New Scientific Knowledge #4)
3. Recognize winter animal signs and smells. (Reflecting on Scientific Knowledge #3)

THINKING SKILLS: Observe and compare and contrast.

-Distribute nametags.

-Introduce self as a ranger. What does a ranger do? Thanks for the invitation, introduce the National Park Idea and discuss the shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside-snow, ice and signs of animals in winter!

1. Pull samples of snow and ice from cooler. Put into containers. Ask kids to predict what will happen to each?
2. Ask why they will change shape? How can we tell? How can we measure what happens to them? A scientific tool called a thermometer.
3. Have kids take turns predicting temperatures and taking temperatures.
4. Next, secretly place winter "animal sign objects" under a bandanna (Deer chewed branch, rabbit chewed branch, hare foot, grouse foot and snowflea picture). Lift up for a few seconds. Ask kids what they remembered. Show and tell about each object.
5. Pass around containers with different winter smells. Have kids try to match a smell to several objects on a table. (Find the fragrant balsam leaves).

Ask if there are any questions. Thank them for their attention and challenge them to be on the lookout for examples of melting snow and ice and animal signs or winter smells the rest of the winter!

MATERIALS NEEDED:

- cooler with snow and ice
- beakers for snow and ice samples
- thermometers
- bandanna
- rabbit chewed twig, deer chewed twig
- balsam branch, cedar branch
- snow flea pictures
- grouse and hare foot and pictures
- film canisters with smells in them

WINTER KINDERGARTEN FIELD ACTIVITY 2000
"EXPLORING SIGNS OF WINTER"
CONCEPTS: AWARENESS, SENSITIVITY, MATTER
TIME: 40 MINUTES

MICHIGAN SCIENCE OBJECTIVES: At the end of the lesson, students will be able to:

1. Explain that all snow, snowflakes and ice are not the same. (Reflecting on Scientific Knowledge #3).
 2. Be able to use a simple tool, a hand lens to see differences in snowflakes or snow. (Constructing New Scientific Knowledge #4)
- THINKING SKILLS: Observe and compare and contrast.
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Introduce self as a ranger. What does a ranger do? Thanks for coming on the field trip. Introduce the National Park idea and shoulder patch. Explain that I'm here to help them understand things they might find in a national park or somewhere outside - snow, ice and signs of animals in winter!

1. Start with a review of objects they looked at in the classroom. Explain that objects are in the 2, 3 or 4 boxes on the ground. Form teams, kids take turns running to boxes to find objects described (balsam branch, cedar branch, snowflea photo, deer chewed branch, hare chewed branch)
2. Use snowflake catchers, hand lenses and snowflake charts to catch and identify snowflakes or snow on ground, looking at similarities and differences.
3. Use "snow frames" to look at different "snow scenes".
4. Sit and listen quietly for the "Song of Winter".
5. Toss "Piece of 8" (gold frisbee) to find hidden treasures, buried under the snow!

Ask them if they have any questions. Thank them for their attention and challenge them to keep on the lookout for more signs and treasures of winter!

MATERIALS NEEDED:

-2, 3 or 4 boxes, -2, 3 or 4 sets of hare and deer chewed twigs, balsam and cedar branches and snow flea photos, hand lenses and snowflake charts, snow frames, carpet squares, gold frisbee, orange playing area cones, raven and chickadee puppet.

WINTER 1ST GRADE IN-CLASS ACTIVITY 2000
"EXPLORING THE WORLD OF WINTER"
CONCEPTS: MATTER AND ATMOSPHERE
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Explain why we have a winter season. (Atmosphere #3)
2. Explain how snow is formed and why it changes shapes. (Changes in Matter #1)

Distribute nametags.

Introduce self as a ranger. What does a ranger do? Thanks for the invitation. Introduce the National Park idea and shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside - winter and changing snow!

1. Use a globe for the earth, and a flashlight as the sun, to demonstrate positions of these during the seasons. Have kids take turns doing the same. Have them draw a picture of this and label.
2. Draw on board how a snowflake is created. Show children charts of different kinds of snowflakes and explain that these depend on moisture amounts and temperatures.
3. Discuss what ways the temperature of snow can change - sunlight, wind, nighttime. Show charts of different Native American terms for snow. Discuss why they had so many terms.
4. Introduce investigation with different colored boards to be set out on top of snowdrift. Have students predict results. Have teacher set out with a student later.

Ask if there are any questions. Thank them for their attention and challenge them to be on the lookout for examples of changing snow. Encourage them to build a quinzee with their parents!

MATERIALS NEEDED:

- globe, flashlight
- chalk
- snowflake charts
- Native American snow term charts
- Several different colored wooden board squares
- Paper and pencils

WINTER 1ST GRADE FIELD ACTIVITY 2000
"EXPLORING THE WORLD OF WINTER"
CONCEPTS: CHANGES IN MATTER
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Identify at least different types of snow and explain how their forms are different and why. (Changes in Matter #1)
 2. Explain how shape or texture of snow is related to friction in winter games like sledding, skiing or tossing snowsnakes. (Changes in Matter #2)
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Introduce self as a ranger. What does a ranger do? Thanks for the invitation. Introduce the National Park Idea and examine shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside - winter and changing snow!

1. Before going outside read stories of Eskimo and Ojibway people. Discuss their winter homes. Read story of Ojibway snowsnake and discuss. Review techniques for building an igloo and playing snowsnake.

2. Outside, have groups of kids pack snow into snowblock molds, to let sit and allow the snow to change texture. Take a look at the snow being packed with hand lens.

3. Demonstrate how to use the "snowsnake" and how to score points. 2 points for getting it past the cones, an additional point for hitting the center cone. Discuss surface, look at sample of ice or snow - discuss friction.

4. Check molds to see if they have "solidified". If so begin laying out blocks for igloo. Leave molds at school if teachers wish to continue building igloo.

Ask students if there are any questions. Thank them for their attention and ask them to be on the lookout for ways we deal with ice and snow today are examples of changing snow textures!

MATERIALS NEEDED:

- stories of Eskimo and Ojibway People in winter
- story of the snowsnake
- snowblock molds
- 5 orange cones
- snowsnakes
- hand lens
- pictures of igloos
- several shovels

WINTER GRADE 2 IN-CLASS ACTIVITY 2000
"EXPLORING TYPES OF SNOWFLAKES"
CONCEPTS: HYDROSPHERE
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Describe how water exists in three states - solid, liquid and gas. (Hydrosphere #1)
2. Be able to set up a simple investigation about snow purity. (Constructing New Scientific Knowledge #6)

Thinking Skills: Observe and Draw Conclusions

Distribute nametags.

Introduce self as a ranger. What does a ranger do? Thanks for the invitation to visit their class. Introduce the National Park idea and the shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside - water in different states!

1. Display sample holding snow, one with ice and another with hot water from a thermos. Show them vapor rising from thermos. Show them vapor hitting glass and turning into "fog". Ask for an explanation of the vapor and fog.
2. Ask how a thermometer could be useful in an investigation of these objects? Ask them to predict temperatures of each. Take temperatures of each.
3. Again ask about the vapor and fog. Demonstrate how molecules of water can be like sand on cardboard. Move slow - condense and form liquid or solid (due to low temperature) move quick - becomes vapor or steam (due to high temperature). Ask kids what causes water form changes?
4. Show them charts of different snowflakes and different temperatures. Review how snowflakes are formed. Discuss.
5. Ask them if the snow sample has dirt in it? How could we find out? Prepare sampling device to be set outside.
6. Discuss pH of snow, what that could do when it melts. Look at pH chart. Explain pH test kits.

Ask them if there are any questions. Thank them for their attention and challenge them to be on the lookout for the changing states of water this winter!

MATERIALS NEEDED:

-cooler with snow and ice samples, thermos with hot water sample, container to pour it in, piece of glass or mirror, thermometers sand, cardboard and whisk broom, snowflake charts, snowflake and moisture and temperature charts, snow sampling device, pH Test Kits and charts.

WINTER GRADE 2 FIELD ACTIVITY 2000
"EXPLORING TYPES OF SNOWFLAKES"
CONCEPTS: HYDROSPHERE
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Identify a snowflake and explain the relationship between its shape and the temperature range in the upper atmosphere. (Hydrosphere #1)
2. Observe snow on top, inside and at the bottom of a snow bank and explain the relationships between the different shapes and temperatures which affected them. (Changes in Matter #1)
3. Explain how particle pollutants can get "into" snow! (Ecosystems #5)

Thinking Skills: Observing, Compare and Contrast, Draw Conclusions.

Introduce self as a ranger. What does a ranger do? Thanks for the invitation to visit their class. Introduce the National Park idea and the shoulder patch. Mention that I'm here to help them understand something they might find in a national park or somewhere outside - snow!

1. If snowing, have kids catch snowflakes on snowflake catchers and use hand lens to identify type of snowflake. Use chart of flakes and ask them to identify whether their flake was formed in a very warm or cold upper atmosphere and an atmosphere with a lot or a little humidity or moisture content.
2. Have kids carefully examine a snow bank. Look at the flakes on the surface, half way down and at the bottom. Have them predict why each is different. Discuss. Take temperatures and discuss
3. Collect snow samples to test from various areas. Have kids predict which sample might have more particulate pollution. Bring them inside to melt and drain through paper toweling to look for particulate pollution. Discuss results.
4. Test melted snow for pH. Discuss results

Ask them if there are any questions. Thank them for their attention and challenge them to be on the lookout for changing states of snow this winter and sources of snow pollution!

MATERIALS NEEDED:

-snowflake catchers, hand lenses, snowflake type and humidity and temperature charts, containers for snow samples, hot plate, extension cord, pot, paper toweling, thermometers, pH Test Kits

WINTER GRADE 3 IN-CLASS ACTIVITY 2000
"EXPLORING HOW ANIMALS SURVIVE THE WINTER"
CONCEPTS: LIVING THINGS AND EVOLUTION
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. State the behavioral adaptations of several animals to winter. (Living Things #4)
2. State the evolutionary adaptation of several animals to winter. (Evolution #2)

Thinking Skills: Observe and synthesize.

Distribute nametags.

Introduce self as a ranger. What does a ranger do? Thanks for the invitation to visit their class. Introduce the National Park idea and the shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside - animal adaptations to winter!

1. Read the Ojibway story "How Turtle Flew South for the Winter" and discuss.

2. Display mounted animal specimens for students to work in groups to examine and make lists of ways each animal has a physical adaptation to survive it's environment. They will also list behavior tactics of each creature to find food and avoid predation.

3. Review lists and brainstorm physical and behavioral adaptations of each creature to winter. Discuss.

4. If time permits, using colored pencils, students are directed to draw and give a name to an imaginary animal. Then list its adaptations to the winter environment.

Ask them if there are any questions. Thank them for their attention and challenge them to be on the lookout for other adaptations to winter!

MATERIALS NEEDED:

- Ojibway story
- mounted specimens: fox, beaver, loon, duck, owl, fish, pine marten
- paper and colored pencils

WINTER GRADE 3 FIELD ACTIVITY 2000
"EXPLORING HOW ANIMALS SURVIVE THE WINTER"
CONCEPTS: LIVING THINGS, SENSES AND EVOLUTION
TIME: 1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. List ways animal senses play an important role in their survival of winter. (Living Things #4, Evolution #2)
2. Describe how the property of insulation affects living things. (Changes in Matter #1)

Thinking Skills: Observe and synthesize

Introduce self as a ranger. What does a ranger do? Thanks for the invitation to visit their class. Introduce the National Park idea and the shoulder patch. Mention that I'm here to help them understand things they might find in a national park or somewhere outside - animal adaptations to winter!

1. Brainstorm a list of the 5 senses and ways animals use these to survive. Elaborate on specific animal examples. Discuss which senses are more important during winter survival?
2. Explain how you will play scent-tracking game outside. Working in teams, students will lay down "scent marks" in the snow for others to try to follow successfully to the end. At each scent a clue in the form of a letter is written on each flag. The teams will write down all their clues then try to scramble their letters to make a word. They must add up a point for each correct code word they "sniff out". Winning teams have the most points.
3. Explain the animal insulation game. Explain again how they will work in teams. This time they will have to: 1. insulate their gel animal using materials given and 2. find a place for their animal to "hibernate". Winning teams will have animals that haven't frozen to death!
4. Play games outside. Come in and discuss.

Ask them if there are any questions. Thank them for their attention and challenge them to be on the lookout for other adaptations to winter!

MATERIALS NEEDED:

- several scents and spray bottles
- red survey marker flags code letters on them
- rakes to hide tracks if playing in deep snow
- thermos with gel animals
- baby food jars
- various insulating materials(newspaper, plastic, cloth and tape)

TEACHER LED WINTER PRE-CLASSROOM VISIT AND FIELD TRIP ACTIVITIES

GRADE 4- 2000

CONCEPT: INTERRELATIONSHIPS

TIME: ONE HOUR

A. PRE-TEST:

To help us evaluate the Pictured Rocks National Lakeshore Education Outreach Program, please have your students complete the following pre-test before you begin any of the activities that follow. Their basic knowledge is of interest to us, but we are more interested in how their understanding of the concept of interrelationships changes as a result of these and other activities. We will ask you to complete the same test with your students following the field trip as a post-test, so that we can make these comparisons and improve the program.

Ask your students to do the following on one side of a sheet of paper. "Use drawings and sentences to explain what you think the term **web of life** means." They should include arrows and words to explain what is happening in their drawings. We will collect these papers during our in-class visit.

B. PRE-TRIP ACTIVITIES:

1. Brainstorm a list of ideas with your students regarding the word **relationship**. Have them tell you a word that comes into their mind when you say the word **relationship**. Write these words on the board. Create a definition of the word **relationship** from the words generated by your students. (Note: Guidelines for brainstorming include no judging of ideas, piggybacking of ideas is allowed, and many ideas are expected.)
2. What does the prefix "inter" mean? Discuss. Write words on the board beginning with inter. Discuss what they mean.
3. Divide your class into several groups of three to five students. Ask them to describe in detail the **interrelationship** between the two objects in each of the following three examples.
 - A. Pizza and a child, cow and a child, maple tree and a child.
 - B. House and a child, bed and a child, jacket and a child
 - C. Rain cloud and a child, stream and a child, drinking fountain and a child.

(Note: Each group should elect a recorder to write the ideas down and a reporter to make a brief presentation to the rest of the groups.)

THANK YOU FOR YOUR HELP IN CONDUCTING THESE ACTIVITIES! WE BELIEVE THEY WILL HELP IMPROVE YOUR STUDENT'S UNDERSTANDING OF THE SCIENCE CONCEPT TO BE COVERED.

WINTER GRADE 4 IN-CLASS ACTIVITY 2000
"THE WEB OF LIFE GAME"
CONCEPT: INTERRELATIONSHIPS
1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Explain the concept of connectedness (or inter-relationships) by describing how certain animals and plants meet their basic needs (*Ecosystem 2 &3*)

Thinking Skills involved: Reason deductively and inductively

Introduce self, thanks for invite, introduce NPS & mission as resource protectors, look at NPS and discuss patch, let students touch pine marten mounted specimen. Introduce what we will cover today - topic is interrelationships and the importance of this topic. Distribute nametags.

REVIEW BASIC LIFE NEEDS: Covered during fall program. Food (also known as energy), water, shelter and space. List on board in different colored chalk - Yellow=food energy, Dark blue=water, Light blue=air, Brown=minerals, Green =shelter and red=space. Add two more (soil - for nutrients and minerals plants need to grow) and (air - what almost all living things need to survive). Explain that these are relationships or connections living things have!

"I have a special guest who would like to tell you a story about a pine marten and how all the animals in the forest are connected together. His name is the "connector inspector" and he's from France." (exit room to put on costume)

"Hello - I am zee connector inspector" I am a detective just like zee famous Sherlock Holmes. But as you might know - he was from England and I am from France.

What do detectives do? We **draw conclusions** to figure something out by making observations. This is also called **inductive reasoning**. We also apply what we already know to determine if our conclusions are correct. This is called **deductive reasoning**. Scientists also use these processes.

Me - the Connector Inspector - I solve problems with connections. Another word for connection is relationship. I would like for you to assist me today as connector inspector aids.

I will read you a story. It is a mystery to be solved..

During each part of the story I will ask you to listen to the connection being described and come up with a detective **conclusion**, identifying which of the 6 connection is being

described.

At the end of the story I will ask you to **deduce** the answer to this mystery by creatively applying things you have learned today about connections!

Today I would like you to help me tell a story of the pine marten and the forest."

"The next time you visit with me we will take a hike through zee forest to look for some of the connections you will hear about today."

"Please try very hard to imagine this pine marten travelling though the forest as I read the story and please **listen carefully**. As I tell the story I will give each of you a picture ID card and you will become that character in the story! I will also connect each character by a white string. Please hold on to the string when I give it to you and don't let go until I tell you to. This string show that you are connected to something else in the forest."

"Each time I make a connection or show a relationship between two characters, raise your hand if you can tell which of the six connections written on the board this represents. For example you might say, "the connection is that the mouse needs the plant for food". (write on board in different colored chalk: brown=soil nutrients, dark blue=water, light blue=air, yellow=food, green=shelter, red= space)
I will then put the correct color flag between the two characters showing the type and direction of the connection represented."

Any questions? OK let's get on with the mystery!

READ THE MYSTERY OF THE PINE MARTEN STORY

PINE MARTEN MYSTERY

FOREST CHARACTERS: pine marten, red squirrel, fox, wood duck, owl, mouse, mole, fallen log, dead tree, cedar tree, hemlock tree, coyote, raspberry bush, woodpecker, wood frog, spring pond, dew on leaves, deer, trout, mink, worm, wood turtle, mosquito, wind, warbler, soil, algae, vole, stream (29)

A long time ago pine forests covered more land than they do today. They were very thick and dense, growing close together and connected. The old timers said that the forest was so vast a pine marten could travel from Maine to Minnesota without ever touching the ground - just by hopping from treetop to treetop.

This is a story about the travels of a pine marten just last year, and the problem she encountered in the forest. It is also a story of all the relationships or connections she discovered in the forest.

One late winter day ----- the pine marten awoke in the top of a big hemlock tree where she lived. ----- is a graceful mammal with very soft dense yellowish-brown fur. She loves to climb and is very athletic with a good sense of balance. ----- likes to live in the treetops where she is safe from animals that would like to eat her like a coyote or fox. As she gazed out from her treetop lookout she could see across a wide grassy field where no trees grew. At one time people were going to put in a road through the forest so they came and cut down all the trees and hauled them away. Something happened and they didn't put in the road, so the area grew into a field on the bare soil. In the distance ----- could see another pine marten! She hadn't seen another pine marten in years and was very excited. But how would she get to the other forest. Instinct wouldn't let her cross the open area -- that was much too dangerous.

----- knew all the other borders to her forest home, which was about five square miles in size. On two other sides were highways she would not cross and on the fourth side was Lake Superior. Was she destined to live her expected 15 years of life alone?

----- thought to herself that she would seek out the answer to her problem from the other members of her forest community the soil, water, air, plants and animals.

As ----- sat there thinking, ----- the warm wind from the south blew through the trees and made her almost lose her balance. --- was very welcome in the U.P. woods after a long cold winter. ----- stretched for miles coming up all the way from places like Florida.

Just then pine marten noticed a tiny bird called a warbler float down out of the sky and land on her hemlock tree. ----- had hitchhiked a ride you could say with ----- the wind, returning from her winter migration home down south. ----- is a beautiful tiny bird with bright colors. ----- has a tiny beak for catching her favorite food -- little insect like mosquitoes and black flies. ----- took a deep breath of air and let out a beautiful call or song on this nice spring-like day. ----- throat moved as she let out fine warbling song.

Pine marten slowly climbed down the big old hemlock tree and jumped onto ----- the old fallen log. ----- was kind of mushy to the touch, spongy and damp. ----- smelled like rich earth which is what she was changing into, as bacteria, worms and insects chewed at ----- insides. Pine marten walked around a baby hemlock tree growing out of ----- . That's how trees like ----- the hemlock are able to grow, by sprouting in old logs people call nurse logs, which provide a good home full of nutrients for them to grow up in. ----- had very delicate tiny needles with two white lines on them. Pine marten sipped a drop of dew hanging on the baby hemlock. Other drops like ----- shown like tiny jewels on the needles. Looking closely at ----- you could see a reflection of the entire forest scene in her as if you were looking in a mirror.

Just then from under the log darted ----- the white-footed mouse. How delicate were ----- tiny white feet which looked like he was wearing tiny white socks or gloves. With big whiskers and tiny hands, ----- nibbled on tiny spring flower he held in his hand and looked around warily with his beady black eyes.

Too bad for ----- because that was his last meal. For drifting silently toward ----- was ----- the barred owl. With a wingspan of four feet long and feathers with tiny crack in them along their edges ----- was able to fly perfectly silent and undetected. ----- grabbed the mouse quickly with his powerful claws (called talons) then flew back to his perch on top of a nearby dead tree to have his breakfast.

Pine marten was pretty shook up by what she had seen, for it could as easily have been her instead of the mouse on the owl's breakfast table.

Pine marten crept past ----- the dead tree. ----- stood still and tall like a statue. He was unable to move anymore because the wind could no longer catch his leaves and cause him to sway. ----- felt strange without his thick outer protective bark which had fallen off. On ----- exposed skin there were millions of holes, where insects or birds had burrowed into him.

Just then ----- the pileated woodpecker pounded loudly on the dead tree, digging out insects and making a sound that echoed through the forest. ----- was a very colorful fellow with a bright red crown on top of his head. Sharp claws at the end of his long toes held on tightly to the tree.

Pine marten moved slowly along the forest floor trying to stay hidden behind dead logs and branches on the forest floor. She knew she must be getting to that little pond that appears in the forest every spring and fall and dries up in the summer when ---- - the mosquito landed on her nose and tried to bite her. ----- has a long, slender firm nose that works just like a straw.

----- flew off with a buzzing sound made by her wings and as pine marten watched a frog jumped up and ate the mosquito. It was --- -- the wood frog. He is a real handsome guy with very smooth skin no warts and a big wide mouth. Along ----- face was a wide black mask or band.

Pine marten watched as ----- jumped into the little forest pond and disappeared. ----- the pond is a murky fellow, kind of a brown color caused by all the decaying leaves and pine needles. He's not very big -- maybe the size of a basketball court or smaller. Millions of mosquito larva live and feed on the tiny green plants called algae in his ----- body.

Pine marten decided to nap in a white cedar tree by the edge of the pond. ----- the white cedar is unlike most trees. ----- roots like to be tickled by muddy soil. Most trees would die if you tried to plant them in very wet land, but not ----- she loved it. Her tiny root hairs sucked up even tinier minerals and nutrients from the rich mud. ----- the deer appeared to drink from the pond. ----- was very attractive, with a thick mat of coarse hair all over his body. It was more like wearing hundreds of paper towel or toilet paper tubes on your body because that's what the hair was really like - hollow tubes. They trapped warm body air in them to provide an insulating layer of warm air between ----- skin and the bitter cold air.

When pine marten awoke she jumped down from the cedar into the soft soil of the forest floor. ----- the soil was hundreds of years old. That's how long it took him to be made. Over the years dead leaves, branches, and animals changed into ----- as their bodies were broken down into tiny pieces by bacteria, insects and other things.

Just then ----- moved and pine marten jumped. It was really ---- - the mole swimming under the surface of ----- . ----- was almost blind with two little flaps of skin covering two very tiny eyes. ----- located his food with a great nose for smell. -----

tunneled along in search of one of his favorite foods - the worm.

The tunnels ----- left behind him actually helped the tree roots as they helped bring some air underground which plants need to breathe too.

----- was blind and moved about by contracting and expanding his big muscles. ----- liked to browse on leaves and decaying things. As ----- went to the bathroom, some thing would appear which looked more like soil than a leaf!

Pine marten walked toward the far end of the pond. She was getting hungry. In the far end of the pond swam ----- a male wood duck. He was one of the most beautiful animals of the forest. ----- feathers looked like someone had hand painted them. ----- was feeding on a tiny plant called algae, growing in the pond.

Just then, something startled the wood duck and he exploded out of the water and flew right out of the water over pine marten head. As he flew he dropped some of the algae on pine marten.

----- the algae looked like the fine long stringy hair of a human baby. ----- was a beautiful bright green color and smelled like the pond water itself. Just then pine marten saw a flash of red out of the corner of her eye, so she quickly scampered up a tree. She saw what had scared the duck. It was ----- the red fox.

----- would eat pine marten if he could catch her. ----- has big ears and a busy tail. He's not a fussy eater; he'll eat just about anything he can catch. Pine marten noticed he already had something to eat in his mouth. It looked like ----- the vole in his mouth.

----- is about seven inches long and is a true vegetarian. She eats only plants, preferring green leaves rather than something like a tasty raspberry. ----- has small eyes and ears and a blunt face. She's a pretty chestnut color sprinkled with grey and black.

As summer arrived, the woods were alive with many sounds like the yipping of coyotes and howling of wolves at night. Two more animals that would like to have pine marten over for dinner!

Pine marten was day dreaming -- if only I could learn how to dig like the mole -- that's how I could get across the field to the other forest where I saw another pine marten, and she sighed.

Just then a sound from below snapped her out of her daydream. It was ----- the coyote and some of his friends trotting through

the forest trying to scare up something to eat. ----- weighs about 50 pounds and looks like a large collie or small German shepherd with a drooping tail. Huge ears stand tall as ----- listens for movement of an animal.

Getting tired of running ----- stopped by ----- a small stream to get a drink of water. ----- ran quickly through the forest and sparkled and glistened with clear cold water. The coyote spooked ----- the brook trout who was hiding near a log in -----.

What a strange critter was ----- . Living in freezing cold water, he was covered with a fishy slime. This slime helps protect ----- skin from diseases. ----- had an eye on each side of his head and a strong tail to propel himself through the water.

Pine marten watched as the coyote romped away then heard a splash and turned to see the trout in the mouth of ----- the mink. ----- was two feet long and a beautiful chocolate color with a bushy tail. Pine marten could see five toe prints on each foot track left by ----- as he scampered downstream with his lunch.

Pine marten thought she saw a squirrel move under _____ a raspberry bush by the stream. She tried to sneak up on a possible meal. When she got there she was disappointed to see that it was ----- the wood turtle. ----- has the unique ability to climb a little and was partly up the raspberry bush eating some of the berries. ----- did not seem scared by pine marten. Pine marten admired the interesting designs on the shell covering his back.

As autumn began to set in, pine marten still hadn't solved her dilemma: how would she ever get to the other forest. She knew there was an answer somewhere; she just hadn't made the connection yet.

Back in her big hemlock tree overlooking the open forest, pine marten noticed ----- the red squirrel in a nearby tree. He likes to eat seeds and nuts and birds eggs. ----- was scurrying about quickly as he likes to do. Pine marten noticed him ripping some things off the branches then dashing away.

A few minutes later pine marten saw ----- run out into the open field, dig in the ground and run away. This went on for about 20 minutes. How odd, she thought. Then hunger got the best of her curiosity and she decided it was time to eat her favorite meal - red squirrel.

She waited in ambush near the bottom of the tree he had been climbing. As he ran back to the tree and she grew ready to pounce something inside her said stop -- no, don't do it -- but

her instinct to eat was stronger and she pounced.

After her meal, she sat gazing out over the field again and thought - will I ever be able to reach the other forest. Just then another red squirrel ran out into the field carrying a huge pine cone. She watched as he buried it in the field sand -- to eat later perhaps in the winter -- and ran away.

I wonder, she thought, how they manage to find all the pine cones they have buried? Then, the thought hit her like a lightning bolt, she turned and looked out into the field and there -- sure enough -- were tiny baby pine trees sprouting up from under the soil that she hadn't noticed before. Someday they would grow up and the gap between the two forests would disappear! The answer to her problem was now in her stomach!

THE END - WHAT IS THE ANSWER TO THIS MYSTERY?

Look at what we have created here. I'm going to ask you to think about this thing we have here and do two things. I'm going to ask you to get into groups of 3 or 4 students and 1. describe what this thing represents in words or a drawing and 2. give this thing a name. Then I will ask each group to report to the class.

REPORTS:

Describe this group of connections between plants and animals as the "Web of Life".

Conclusion: Show globe and explain that connections occur all around the world. Explain that during the field trip we will learn about more connections in our area and ways they can be broken. Finally we will cover ways kids can help protect these connections or interrelationships in their own lives.

MATERIALS:

- _____ Pine marten specimen
- _____ Red squirrel specimen
- _____ colored chalk
- _____ brown __ dark blue __ light blue __ yellow __ green __ red
- _____ white macrame roll
- _____ pipe cleaners or colored scraps of macrame
- _____ brown __ dark blue __ light blue __ yellow __ green __ pink
- _____ forest poster handouts (missing)
- _____ 5x7 cards
- _____ Connector Inspector outfit
- _____ black turtleneck
- _____ globe

WINTER GRADE 4 FIELD ACTIVITY 2000
"THE CONNECTOR INSPECTOR"
CONCEPT: INTERRELATIONSHIPS
3 HOURS

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson students will be able to:

1. Explain the concept web of life and the term inter-relationships in the natural world and give examples. (*Ecosystem #2 and #3*)
2. Describe the change in matter from water into snow. (*Changes in Matter #1*)
3. Measure the physical properties of snow. (*Matter and Energy #2*)

Thinking Skills: observe, predict, draw conclusions, summarize

Bus arrives, welcome to PIRO on bus, nametags, introduce self, assistant and program. Explain where restroom is to use in a few minutes. **Safety:** Review safety rules for day and behavior expected. Mention that you have extra gloves and hats. Check kids getting off bus for warm shoes and jackets. Bring kids inside building. Ask teacher to distribute nametags. Have kids sit on floor on carpet squares and unzip coats. Collect pre-tests.

Introduction: Boys and girls, you are on a mission today! It is a mission of grave importance. Today you will be asked to create a model for the web of life. Constructing this model is vital for you to understand how to protect life on earth for the rest of your lives!

What you have learned about interrelationships thus far will help you to accomplish this task, so please keep that information in your mind. Who recalls what a natural interrelationship is? What kinds are there that you learned about in the pine marten story?

In the house a web with a giant leaf and caterpillar is on the wall. The sun is in the center as a yellow disk. Radial lines in different colors make up the strands of the "web". The ranger welcomes the group to his training course today and explains that nothing can exist by itself. Everything is connected to other things in the web of life. To help you remember the web after today I have a button with the letters W.E.B. on it. At the end of the program see if you can figure out what the W, E and B stand for to describe this idea.

Look at the caterpillar now, it is connected or has a relationship to the plant in several ways. Can you name one way? (air, water, soil, light energy for making food)
How about the relationships or connections between the caterpillar and the plant. Each connection is shown by a different colored web strand. Air = blue, soil nutrients = brown, water= dark blue and energy = yellow.
During the next part of the training course you will become a plant or animal and must connect yourself into the web of life to get your basic needs. You will get a card to hang around your neck like this one. It shows what you animal or plant you are and what your basic needs are. Please look at these things carefully. You will need this information when you connect yourself to the web. Distribute cards. Let kids look at. Any questions? Collect cards.

OK before we go outside, put on snowshoes and head to training course location I'd like to review **Snowshoe safety**: No running or jumping, if someone falls, help them get up, and please don't get too close to each other so you step on another persons' snowshoe tail - that will cause them to fall. Demonstrate how to put them on.
Please the restroom if you need to at this time.

Activity #1: Hike to connector inspector training course.

There are several large stakes in the ground. On the front of the stakes, there are large symbols for clouds, soil or lakes. In the center is a sun symbol. These are what the students connect themselves to according to where they get their needs. Of course, only the plants connect to the sun; the rest must connect to animals or plants to get their energy.

Demonstrate one for the students.

First to connect are the producers (plants)
Next are first level consumers (plant eaters)
Finally the second level consumers (predators)

After everyone is connected ask, "What does this look like? A WEB! What have you created? You have just recreated the incredibly complicated connections that tie everything together in the web of life. Connections like this occur everywhere in real life, even if we don't always see them."

"But hang on for a second. I'm going to do just **one** thing! Then I'm going to ask you to apply your information about the web of life to tell me if you my action would or would not harm the web of life.

OK let's pretend I live in the city and I'm going to put some

weed killer on these weeds in the web of life in my yard. I don't want to hurt anything else in the web but this one kind of weed. What do you think about this? Is this true that I will not hurt anything else in the web? ANSWERS. Why might the rest of the web get hurt too? (Because of connections or interrelationships) Does everyone see this? Any questions?

"You're right, if it rains some of that poison may wash into a creek which empties into a lake, so I've done more than one thing. I've poisoned the weeds in my yard and the plants in the lake. So I'm afraid the plants that live in my yard and the lake better sit down because you've been dis-connected!"

"But now look what I've done. Since these plants have been disconnected, guess what happens to the things that are connected to them. That's right - they're disconnected too! Have a seat!

"That one little thing I did sure has ended up doing an awful lot. It's affected so many other things. Why? (because everything is connected in the web of life) Every time do something to one part of the web, we end up affecting other parts too! **REMEMBER - YOU CAN'T EVER JUST DO ONE THING TO THE WEB OF LIFE!**

"Let's head down the trail and look for other connections or relationships out here in the web of life using our special "connector scopes" as we hike along the trail toward the beaver pond.

Activity 2: Native American Snow Terms

The native americans had a great many terms for snow. Can anyone guess why? (to describe different kinds of snow) Do you think this was important to them to describe different kinds of snow? YES Why? (because of their close relationship with the outdoors for their survival ie good snow for tracking - with a variety of snow terms they could tell each other more clearly what the other could expect to find)

I'd like to distribute some laminated cards for you right now to look at the native american snow terms. As we hike along, I'd like you to try to find different kinds of snow and think about the relationships of those kinds of snow! Also- if you would like - think of a new name for a type of snow you might see and be able to tell it's relationship to something else!

Discuss findings.

Activity 3: At the beaver pond:

Discuss relationship of beaver lodge to beaver, beaver to pond, how beaver survives winter. Discuss fact that we don't want to walk across lodge and pack down snow. WHY (puffy snow with air pockets is a great insulator - packed down snow isn't)

What could a scientist do to prove snow is a good insulator?

(conduct an investigation) What could we do?

Predict temp below the snow and use thermometer to collect data. Working in groups have kids do this with soil thermometers. Take them step by step through scientific method. Predict - gather data -interpret data - conclusion.

So below the snow it is warmer? How much? Do any animals use this fact?

(hare, grouse, moose, mice) Could snow help people at our house? (keeps pipes from freezing, plants in garden, around basement keeps it warmer)

In the winter, snow provides many interesting kinds of relationships or connections.

Children are asked to predict different temperatures above, below and in the snow. How would a scientist collect this data? Use thermometer. Analyze information gathered. What does snow do for animals? How can it affect people and their homes?

BACK TO HOUSE, WARM UP,

OK - it's time to try to put all of this together so it makes sense for everyone - this whole business of connections and the web of life. The connector inspector has a badge with the letters W.E.B. on it to help him remember what the web of life stands for.

I'd like each of you to come up with a drawing or diagram that will help you remember how the web of life works. Explain on the back what you web of life diagram or drawing means. **POST TEST**

The connector inspectors letters W.E.B. does anyone think they know what they stand for? WAY EVERYTHING BEHAVES.

CONCLUSION: Hold up globe of earth and endangered species and explain that 74 plant or animal species per day are becoming extinct because people are breaking the connections or interrelationships in the web. We need to keep all the pieces of the web - because for many we still don't know how they are connected to other things. Perhaps a plant or animal species could be a cure for cancer someday or maybe it is a source of food for something. It's nice to keep as many things as possible intact in the web of life if nothing else just to enjoy their beauty and uniqueness.

You can help, in your life, with things that you do or do not do! I'm going to ask your teacher to give you this take home activity when you get back to school. I'd like you to take it home and do what it says with your parents or guardians. That way you can help protect the web of life and teach them about it at the same time!

If you complete this activity and bring the completed form to your teacher, she will send it to me and I will send you one of these Resource Keeper Glass Beads, which shows you care enough to help take care of interrelationships and our web of life.

Thanks! Rangers and teachers can't do it alone. We need everyone's help.

Goodbye. Load up bus.

MATERIALS:

- _____ pencils & 3x5 cards
- _____ web
- _____ leaf
- _____ caterpillar
- _____ endangered species globe
- _____ connection posts (7)
- _____ connection post signs (7)
- _____ connector scopes (31)
- _____ animal/plant role cards, on string (31)
- _____ eye hooks for connector posts
- _____ laminated snow ID charts (15)
- _____ magnifying lenses (20)
- _____ soil thermometers (8)
- _____ snow shoes
- _____ W.E.B. badge
- _____ dry erase board
- _____ globe
- _____ "poison spray"

WINTER GRADE 4 FOLLOW-UP ACTIVITIES 2000
CONCEPT - INTERRELATIONSHIPS

Understanding the science concept interrelationships is important. Doing something to help protect natural interrelationships is vital to protecting our natural resources!

To earn a Pictured Rocks National Lakeshore "Resource Keeper" glass bead for the concept of interrelationships, please complete the following activity.

ACTIVITY:

Create a poster entitled "Little Things Add Up for Wildlife." Somewhere on the poster, show how people can help protect or repair some connections or relationships for wildlife.

Perhaps these could be posted around the school or somewhere in the community to inform others about interrelationships.

Explain what your poster was about here:

After completing the above activities, have your parent or guardian review them and sign this form. Next, return the poster and this form to your teacher.

A "Resource Keeper Bead" will be sent to you, which shows you understand this concept and are willing to help protect our natural resources. Thanks!

Name of student: _____ Date: _____

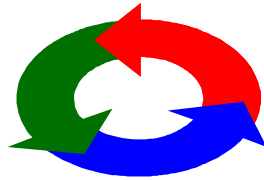
School: _____ Teacher: _____

Signature of parent or guardian: _____

**WINTER 5TH GRADE ACTIVITIES
(CONCEPT: THE WATER CYCLE)**

- 1. Pre-test:** Use drawings and sentences to explain what the water cycle is.
- 2. Teacher led activity:** Students draw examples of cycles and listen to a guided imagery story about the water cycle.
- 3. Ranger led in class activity:** A student "hands on" investigation of the water cycle using the scientific method.
- 4. Field trip:** Students work in teams using guide books to follow the cyclic trails of water, soil and air molecules.
- 5. Post-test:** Use drawings and sentences to explain what the water cycle is.
- 6. Follow-up activity:** Students are asked to do things at home to help protect the water cycle or make a poster illustrating how people can help protect the water cycle.

TEACHER LED PRE-CLASSROOM VISIT AND FIELD TRIP ACTIVITIES
WINTER 2000-GRADE 5- 1 HOUR
CONCEPT: THE WATER CYCLE



A. PRE-TEST:

To help us evaluate this Pictured Rocks National Lakeshore Education Outreach Program, please have your students complete the following pre-test before you begin any of the activities that follow. Their basic knowledge is of interest to us, but we are more interested in how their understanding of the concept of the water cycle changes as a result of these and other activities. We will ask you to complete the same test with your students following the field trip as a post-test, so that we can make these comparisons and improve the program.

Ask your students to do the following on one side of a sheet of paper. "Use drawings and sentences to explain what you think the **water cycle** is." They should include arrows and words to explain what is happening in their drawings. We will collect these papers during our in-class visit.

B. PRE-TRIP ACTIVITIES:

1. REVIEW OF "CYCLES"

Ask each student to draw in detail the **cycle** represented by each of the following examples: a calendar, a watch, a washing machine and a ferris wheel. Review examples with the class.

2. INTRODUCTION TO WATER CYCLE

During this next activity, if you can, play recorded music of water -- waves, rainfall or a river -- softly in the background. Begin leading your students through a guided imagery experience by reading the following.

"You are to try to imagine the things you will hear me describing ... Sit comfortably and close your eyes ... Relax and do your best to imagine what I am describing ... You are sitting on the edge of a small stream ... Your bare feet are swinging in clean, clear water ... The water feels good, but it is cool ... You

feel a current washing over your feet, pulling at them ... Think about the water flowing past your feet until it reaches a larger stream ... Feel its more powerful flow ... See the green ribbon of trees and plant life on the banks ...

The larger stream empties into Lake Superior ... Feel the waves lapping at your feet along the shore ... The water in Lake Superior is flowing, flowing through the rapids by the Soo Locks, south down Lake Huron and Lake St. Clair, past farmlands and the city of Detroit until it eventually reaches the Atlantic Ocean

...
Through your feet and the continuous currents of water, you can imagine that you feel the sea ... Now stretch your mind and realize that you interconnect with all the world's oceans ... You are now touching one single body of water that stretches all around the world ... Your own body contains water that is a part of this system ... Your touch laps against the shores of the Pacific Ocean, it flows under the Golden Gate bridge in San Francisco's bay ...

It pours from the sky as a storm rages dark and grey ... It drenches an Alaskan native who shivers on the Arctic shores before her parka begins to warm her ... It glistens on the back of a Greek boy who tugs fiercely on fishing nets in the warm Mediterranean Sea ...

Water connects your feet with every stream flowing into the oceans around the world ... You can reach up the rivers into the hearts of continents ... You can feel the tremor of the hippopotamus that just dove into an African river ...

You can feel an alligator silently sliding toward a Great Blue Heron in the Florida Everglades ... You can feel beavers busily building a dam on a stream in Europe ... You can see water, thousands of tons of it, in great drifting fleets of heavy white clouds ... Your reach embraces all the whales, all the porpoises, all the sharks ...

You are connected with the mythic creatures, living only in the minds of people in the past -- mermaids, citizens of Atlantis, and the mythic monsters that swim in Loch Ness ... Your feet feel the flow of the current of the miles-wide Amazon River in South America, the ancient Nile pushing north in Africa, the Colorado River thundering with a boat full of river rafters through the Grand Canyon ...

Your watery embrace wraps all around the Earth ... And, of course, the water flowing over your feet connects you with everyone else who is now sitting, with feet dangling in a stream,

wondering where the water goes ... It is time to come back ... Bring the limits of your senses back from the world's rivers and oceans ... back to the surfaces of your feet ... back to where you are ... When you feel ready, you may open your eyes."

3. Once the imagery is complete, ask the students to open their eyes. Tell them that they each had their own private journey even though they all heard the same words. Tell them that in a moment you will ask them to close their eyes again to find one place on the journey through the world's waters that was their favorite. Ask them to try to remember what that image was like.
4. Ask them to relax again and have them try to re-create the picture in their minds. Tell them to look at the detail, the colors, the plants and animals, and to try to capture it all in one scene. Have them pay particular attention to the role of water in the lives of people, plants, and animals.
5. When you feel they have had enough time, ask them to open their eyes. Provide the art materials and ask them to each get paint sets and paper and to quietly paint the image of their favorite place. OPTIONAL: You may provide an opportunity at this time for some or all of the students to talk briefly about their favorite places.

6. REVIEW OF FRESH WATER:

Water is great stuff! The earth and our bodies are mostly water. In fact - about 70% water!
Let's see what kinds we have. Show a jar with 10 cups water in it. This represents all the water on earth - both salt and fresh. Take out one third of a cup = all fresh water! Take 3.5 tablespoons out of this one cup and put into ice cube tray = all ice and snow on earth. Take another teaspoon out = all water in lakes, ponds and rivers. Pour rest in clear container with gravel in it. The rest = ground water.

IS THERE A LIMITED OR UNLIMITED AMOUNT OF WATER ON EARTH?
FRESHWATER? Limited!

THANK YOU FOR YOUR HELP BY CONDUCTING THESE ACTIVITIES! WE BELIEVE THEY WILL HELP PREPARE YOUR STUDENTS TO UNDERSTAND THE CONCEPT TO BE COVERED.

WINTER GRADE 5 IN-CLASS ACTIVITIES-2000

"CYCLE-MANIA INVESTIGATIONS"

1 HOUR

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Describe what happens when water evaporates or condenses.
(*Changes in Matter 4*)
 2. Trace the path of rainwater after it falls. (*Hydrosphere 2*)
- Thinking Skills involved: observe, predict, reason logically
-

Introduction:

Nametags, pre-test collection

"Thank you for allowing me to visit with you. Introduce self, PIRO, NPS, NPS MISSION - we are NATURAL RESOURCE KEEPERS that is ... concerned about taking care of our natural resources like plants, animals, soil, water, air and water"

"Today we are going to explore some ideas about that magical stuff called water and prepare you for your snowshoe field trip to the National Lakeshore to follow paths of water as it moves in a great cycle - a cycle that supports all life on earth!"

OK - with that in your mind - "How would you like to drink some of the same water that George Washington or Rachel Carson drank? Believe it or not, but I have some famous water molecules or -- lets call them specks -- for you to sample, but not today. First you need to find out how this magical stuff called water behaves in our world."

Today we will explore how water behaves. Working in teams you will conduct investigations and try to learn why water changes shape and moves in a cycle? We'll do so using the scientific method of investigation. Review it.

1. stating a hypothesis or prediction about something,
 2. collecting data or testing to see if you're right,
 3. interpreting test results and
 4. making a conclusion about your prediction.
- That's what scientists do! They search and re-search for answers to questions about our world."
-

Review what a cycle is?

Review the following handout:

SCIENTIFIC METHOD SHEET FOR AN INVESTIGATION OF THE WATER CYCLE

Student Group Names: _____

Problem or Question: What causes water to change shape and move in a cycle?

Your Group Prediction (complete this sentence):

Water changes shape and moves in a cycle because:

Gather Data: Conduct the 3 hands on activities together with your group. Carefully observe the demonstrations presented to you. Take notes on what you have observed during all of these activities.

Interpret Data: As a group decide what the data you have collected and observed means in relation to the water cycle. Write down your conclusion below.

Conclusion: Water changes shape and moves in a cycle because:

GROUP ACTIVITIES

Directions: Please work carefully and quietly in groups of 4-5 students.

1. Decide who will be the reporter and take notes and complete the answer sheet?
2. 2. Decide who will read the directions for each of the 3 stations.
3. Decide who will conduct which activity? (please take turns)
4. Decide who will report to your class on your conclusion?

STATION 1: GROUND MODEL

Slowly empty a cloud by "pouring a cup of water" on the "ground" to simulate rain. Observe what happens, record your observations.

STATION 2: LAKE AND SKY MODEL

Get a jar with water in it and a plastic lid. This represents a lake with the sky above it. Use a hair dryer (representing the sun) to send its rays into the "lake". Observe and record what happens.

STATION 3: WATER FORMS MODEL

Each person must dip their finger into the container of water and pull it out. Do not move finger around. Observe and record what happens.

Explain that they have ____ minutes to complete the stations. Only two groups at each station please.

Before student conclusions demonstrate sand on cardboard. Show how sand molecules go slow and are tightly packed as solid, have more space and move faster as liquid and move very fast and spread apart as a gas.

Explain the water model (aquarium), which shows a cross-section of a stream, lake and below ground level. Demonstrate pollution of wells, lakes ect. Discuss landfills.

STUDENT CONCLUSIONS PRESENTED

USING WATER CYCLE POSTER: Review - water heats up- goes from a liquid form to a form that doesn't reflect light - gas (evaporation) the water vapor rises in the sky and hits a cold layer of air slowing down the water molecules, clumping them together so they become visible as clouds (condensation) - as clouds continue to condense they get bigger and heavier molecules And become liquid and fall from sky (precipitation) - some water seeps into ground, some drains into lakes and streams (show great lakes drainage poster) and some evaporates again and goes up into the sky to start the cycle over again!

Nice job - on your field trip you will trace molecules or specks as they travel on their journeys through the water cycle. We'll also explore a frozen beaver pond area. Dress warm! Wool socks and hats!

MATERIALS:

- _____ George Washington and Rachel Carson water jars
- _____ copies of water investigation sheets
- _____ bag of sand, cardboard
- _____ broom & dust pan
- _____ extension cords pencils
- _____ towels/rags
- _____ outlet adapter
- _____ specks bag
- _____ water model
- _____ aquarium ____ water jug ____ tubing ____ food coloring
- _____ jars with plastic wrap on top
- _____ hair dryers
- _____ plastic cups
- _____ chalk
- _____ nametags
- _____ poster of watershed, scientific method

WINTER GRADE 5 FIELD TRIP ACTIVITIES 2000
"THE GREAT SPECTACKLE"
CONCEPT: WATER CYCLE
2 HOURS

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Name material that cycles through the environment.
(*Ecosystem 10*)
2. Describe the physical properties of water, snow and ice.
(*Matter and Energy 8*)
3. Describe one way in which humans alter the water cycle.
(*Ecosystem 11*)

Thinking Skills Involved: observe, predict, classify, compare and contrast and reason logically

Bus arrives, welcome group to PIRO on bus. introduce self, assistant? and program. Explain where restroom is to use in a few minutes.

Safety: Review safety rules and behavior expected. Mention that you have extra gloves and hats. Check kids getting off bus for warm shoes and jackets. Bring kids inside building. Ask teacher to distribute nametags. Have kids sit on floor on carpet squares and unzip coats. Collect pre-tests.

"THE GREAT SPECKTACKLE" from CONCEPTUAL ENCOUNTERS by Earth Education Institute

Today we are going to think like scientists and continue to explore how water behaves and the circle or cycle it travels in. We'll do a demonstration and investigation inside, then head outside and put on snowshoes to follow the paths of water specks!

Next we'll go exploring out by a beaver pond to discover more about this magical, mysterious life giving substance called water!

Finally we hope to let you sample some of these famous specks!

Scientists believe that everything in the universe is made up of one of two things. Who knows what those are? (either energy or matter). All matter on earth can be broken down into molecules or we can call them specks because they are so small they are sometimes invisible to our eyes. Three basic kinds of specks we have are air, soil and water. And many times the specks mix together. Let me show you."

"Using my special speck dissector, I'll put this apple in and out comes -- specks of air, water and soil (three baggies of different colored clay balls). You see, apples are made up of air,

water and soil or nutrient molecules. Would somebody like to assist me now? I need a keeper of the air, soil and water molecules. I would like to demonstrate further. First I'd like to make something that has perhaps equal parts water, soil and air. What is it? That's right -- it's a tree!"

"Next I'd like to make something that is mostly soil specks but also has some air and water molecules in it. Pass me three soil and one of each of the others. Guess what it is? That's right - it's a rock!"

"And now for the big one! It's mostly water, with big hollow tubes running through it. It is constantly taking in and getting rid of specks. It also has some nutrients and air molecules in it. Pass me three water and one of each of the other molecules or specks. Can you guess what it is? THAT'S RIGHT - IT'S A PERSON!"

"We breathe in air molecules of oxygen, and we exhale molecules of carbon dioxide. We drink water specks and get rid of molecules we don't need. And with soil specks, it's the same. I don't know about you, but I don't like to eat dirt. So, how do we get our soil or nutrient molecules? That's right -- through the plants we eat. And they get their nutrients and minerals from the soil -- by absorbing them up through their roots. So when I eat a plant or animal I get my specks of soil, then the waste soil specks come out!"

"We are really just a collection of molecules or specks with more molecules passing through us to be used over and over again. And in our world (hold up globe), there are only so many molecules of air, soil and water to go around -- so they must be used over and over again or recycled."

"Today I would like you to act like a scientist when you are outdoors and **observe** using your senses, very carefully the way these specks behave in the natural world. Your fate and the fate of many other living things may rest on your understanding of these ideas. I may be back later to see if can **interpret** your observations and make an appropriate **conclusion** about them.

Review snowshoe use, invention by native americans , safety, getting lost, safety person for road, restrooms.

ACTIVITY # 1: SPECKS TRAIL GUIDE (INVESTIGATIONS WRITTEN IN ACTIVITY GUIDE):

"Before we begin this next activity please remember, there are only so many or a limited number of specks of water out there, so they must be recycled and used over and over again. Some of these specks have been on some pretty amazing journeys in some pretty far out places. In fact right now you are going to get to follow the paths of some of the specks from Speck Trail Junction. This way please.

Next - Demonstrate how trail guide books work - divide into groups for 6 trails - each group visits 3 - one for each different color, take turn reading and doing activities. Kids use self guiding trail guidebooks to follow the trails of water molecules or specks.

Read postcard and show specks album to those finishing early.

Everyone understand the trail guides and what happened. Someone explain theirs? Any questions. Anybody observe black dots? What were they? Poison speck!

Let me tell you a story of a water speck and a poison speck.

READ STORY AND SHOW PICTURES

What did story mean? Its getting harder for water specks to avoid to becoming poison specks because they move around alot and can pick up or give off poison as they become parts of many different things like clouds, streams, snow and even people!

Lets head out now to explore water specks some more! Hike up trail a bit.

STOP 1: (Snowflake Catchers and lenses)

Does anybody know how snowflakes are formed? Water specks in gas form freeze in very cold temperatures in the sky into a crystal on a speck of dust, pollen, or even other chemicals floating up in the sky."

"Are all snowflakes the same?" Well let's do some observations to find out. Pass out snowflake catchers and hand lenses to see if they are. Pass out laminated cards of flakes and snow names for kids to see.

Why aren't all snowflakes the same? (they are "born"? under different conditions of temperature and moisture in the sky)

Distribute snowflake catchers and hand lenses. Try to identify different kinds of snowflakes along the way.
Look on top. Under. Falling from the sky.

STOP 2:

Look at snowdrift. Is same kind of snow on top as in middle or bottom? What can we do to find out? Do it? Why changes?

(temperature, and also weight or pressure)

Look at Native American snow chart. Why do they have so many names for the same thing? NOT SAME - affects what that means for their outdoor lives!

What specks are in snow? (water and air)

Will this affect temperatures? What to do to find out? Do it!

USE THERMOMETERS!

STOP 3: TREES

Discuss conifer and deciduous tree relationships to water cycle.

STOP 4 CLIFFS

Pictured Rocks cliffs behind pond. What will happen to snow specks this spring? Where will they go?

STOP 5 ICE

Pass around sample of frozen water specks? Why did they go from liquid to solid? Temp. As molecules slow down they get hard. Can you think of an example of something else that solidifies as it cools? Jello, cookies.

Ice on pond. What kind of specks? What type of matter form: liquid, gas or solid? At what temperature does water freeze (Water freezes at 32 degrees). How deep does water freeze? What happens to water below ice? How does snow affect ice build up? What do the students think temperature is just below ice? Chip through augered hole and take temperature. Based on what you know about ice, water and air specks - what is the value of having water specks turn to ice on the top of the pond?

STOP 5 BEAVER LODGE

Hike to beaver lodge. What is this? How do beaver survive the ice and snow cycle?.

Pick up handful of snow - see fluffy - not compact - has lots of holes or air spaces for oxygen to pass through. What other good thing do these air spaces do in the snow (insulate) Guess what happens when you walk on snow or drive on it with a car or snowmobile? (It compacts air spaces). So based on this information why do you think I'm asking you not to walk across or ride your snowmobile across a beaver lodge (less air and more cold for the beavers) Similar to why peoples water pipes freeze under their driveway. Who could explain?

Observe different colored boards that were placed on snow. What has happened and why? Dark colors absorbed heat and heat melted some snow molecules.

STOP 6 CEDAR SWAMP (if time)

Explore cedar swamp. Why deer live here in winter?

Any animals that like deep snow?

Magic Spot Activity or Snow Sculptures.

Head back. Quietly listen and look for birds and other animals. Along the way, **use key** of animal tracks card to find signs of animals in the snow specks.

CONCLUSION: Back inside.

Now I would like you to apply what you know about the movement of water. Here is a difficult question for you. If I dumped some oil on the road by that pond surface today. How could that oil pollution end up on some kids tomato in his garden in Maine next summer?

WATER BOTTLE - So are you ready to sample some water George Washington or Rachel Carson may have sampled?
label falls off - explain finite amount of water, it has to be recycled, this really could be some water from George or Elenoar.
"Did you know water in most cites is recycled through sewage treatment plants. However, some pollution which get in water is not easily removed nor detected!"

"WATER AND THE OTHER BUILDING MATERIALS LIFE ARE CONSTANTLY RECYCLED OR REUSED - THROUGH THE EARTH AND THROUGH OUR BODIES - THAT IS WHY YOU SHOULD LEARN HOW TO KEEP THEM (the water, air and soil) AS CLEAN AS POSSIBLE."

Post tests (**CONCLUSIONS**)- USE DRAWINGS AND SENTENCES TO **DESCRIBE** WHAT YOU THINK THE WATER CYCLE IS. USE ARROWS AND WORDS TO EXPLAIN YOUR DRAWING. REMEMBER - CYCLE MEANS CIRCLE.

"Did anybody have fun? Hope you did but also hope you remember how water cycle works!"

"Your assignment to earn a RESOURCE KEEPER bead: Do something to help a the water cycle! Distribute follow up activity, (**SYNTHESIS OF CONCEPT**) and show bead they can earn. Please remember not to dump oil or poisons on the ground or burn garbage because they get into water and air and then our bodies through the water cycle."

"On behalf of clean water, air and soil specks or molecules who can't speak for themselves, I thank you! Goodbye!"

MATERIALS NEEDED:

- _____ specks bag
- _____ apple
- _____ speck dissection
- _____ water bucket
- _____ paper clips
- _____ hand mirror
- _____ trail guide books
- _____ trail guide posts
- _____ snowshoes
- _____ snowflake catchers
- _____ snowflake charts
- _____ paper cup
- _____ ice spud for pre-drilled hole
- _____ thermometer on string
- _____ animal track cards
- _____ magnifying lenses

WINTER GRADE 5 FOLLOW UP ACTIVITY - 2000

CONCEPT: WATER CYCLE

Knowing a science concept is important. Knowing how to use the concept in your life is also important. By living according to natural science concepts and teaching others about them you can help conserve valuable natural resources we all depend on!

To earn a Pictured Rocks National Lakeshore "Resource Keeper" glass bead and wristband (which shows you understand the concept of the water cycle and are willing to help protect it), please do at least one of the following two activities.

1. FIND A WAY TO CONSERVE WATER AT YOUR HOME!

Make an inventory list of all the ways your family uses water. See if there are any ways water is being wasted. Determine how you might prevent this water waste and do it with your family! In the space below explain in complete sentences:

- a. what you did to conserve water
- b. how your action will **help** the water cycle.

2. CREATE A POSTER entitled "Be Careful With Water" and explain why people should be careful with water based on your understanding of the water cycle. Find a place to put your poster up for others to see! Write in the following space where you put up your poster:_____

Finally, have your parent or guardian sign this form and return it to your teacher. A "Resource Keeper Bead" showing your understanding of this important concept will be sent to you.

Name _____ Date _____

School _____ Teacher _____

Parent/Guardian Signature _____

TEACHER LED WINTER PRE-CLASSROOM VISIT AND FIELD TRIP ACTIVITIES
GRADE 6 - 2000
CONCEPT: CHANGE
1 HOUR

- A. **PRE-TEST:** To help us evaluate the Pictured Rocks National Lakeshore Education Outreach Program, please have your students complete the following pre-test before you begin any of the activities that follow. Their basic knowledge is of interest to us, but we are more interested in how their understanding of the concept of change may change as a result of these and other activities. We will ask you to complete the same test with your students following the field trip as a post-test, so that we can make these comparisons and improve the program.

Ask your students to do the following on one side of a sheet of paper. "Use drawings and sentences to explain what you think the following sentence means. **All plants and animals and the places where they live are becoming something else.**" They should include arrows and words to explain what is happening in their drawings. We will collect these papers during our in-class visit.

B. **PRE-TRIP ACTIVITIES:**

1. Brainstorm a list of ideas with your students regarding the word **change**. Have them tell you a word that comes into their mind when you say the word **change**. Write these words on the board. Create a definition of the word **change** from the words generated by your students. (Note: Guidelines for brainstorming include no judging of ideas, piggybacking of ideas is allowed, and many ideas are expected.)
2. Divide your class into several groups of three to five students. Ask them to describe in detail the **changes** represented by each of the following examples:
 - a. an insect egg becoming a butterfly
 - b. a forest becoming a shopping mall
 - c. a seed becoming a tree

(Note: Each group should elect a recorder to write the ideas down and a reporter to make a brief presentation to the rest of the groups.)

THANK YOU FOR YOUR HELP IN CONDUCTING THESE ACTIVITIES! WE BELIEVE THEY WILL HELP IMPROVE YOUR STUDENT'S UNDERSTANDING OF THE SCIENCE CONCEPT TO BE COVERED.

WINTER GRADE 6 IN-CLASS ACTIVITIES 2000
"SHAPE SHIFTING" - CONCEPT: CHANGE

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will become familiar with the following knowledge (and hopefully attain at the end of the field trip):

1. Explain how surface features changed in the U.P. (lakes were formed) by glaciers. (*Geosphere 10*)
2. Describe two types of climates that have existed in the U.P. (temperate and tropical). (*Atmosphere 11*)
3. Describe the process of succession of an ecosystem (lake) over time. (*Ecosystem 9*)
4. Describe (water) erosion. (*Changes in Matter 6*)

THINKING SKILLS: Observe, make analogies

GOALS: Students will begin to understand how change has occurred in the landforms, life forms and climate of the Upper Peninsula over time and how changes are still occurring to the environment.

Introduction:

"Thanks for permission to visit. I'm --, discuss NPS, NPS Mission. I would like to conduct activities with you today to help you understand the concept of change. Can something ever stay the same?"

"Today you will work in groups at three investigation stations to learn about four instruments of change in the Upper Peninsula. Before we begin, I would like to explain a little about time first."

"Geologists believe our earth to be 3-4 billion years old. That's three thousand million years. Let's write that on the board. It would look like this. 3,000,000,000. If you compared that amount of time to 60 minutes - humans have been on the earth about two seconds compared to 10 minutes for other life forms. It is believe that the first life, some algae, appeared on earth about 500 million years ago= 500,000,000. We usually measure time in seconds, minutes, hours, days, weeks and years. We are around for 80 years if we're lucky. The oldest living thing on earth is the bristlecone pine tree in the mountains of California. Some are believed to be 3,000 years old!"

"Everyday you change. Cells in your body grow and die. Look under your bed to see dead skin cells. And so it is with all living and non-living things on earth, they are in the process of becoming something else. For the next 20 minutes I would like you to investigate four different forces of change. You will work in groups, then we will review your findings afterwards."

DIRECTIONS: "Work in groups of 7-9 students. As soon as you have all the directions please begin. You will have 10 minutes to conduct each investigation. There are three investigations."

Each group must first elect a person to do each of the following jobs, if you don't have a job at the first station, switch with someone for the next. Everyone needs to do at least 1 job.

1. Reader: read directions to your group.
2. Materials Manager: gathers materials, returns materials, cleans up after use for next group to use.
3. Investigator: actually conducts experiment as called for.
4. Recorder: writes information down on data sheet.
5. Presenter: reads or explains findings to rest of class after all investigations are completed.
6. Time keeper: keeps track of time allotted to conduct each activity.

INVESTIGATION 1: DIRECTIONS AND DATA SHEET

Materials needed: pan with sand in bottom, cup of water, picture of beach, pan with sand blob in it, 2 cups of water, picture of Pictured Rocks Cliffs

Part A

Step 1: Tilt the pan with the sand in it about 45 degrees. Slowly pour one cup of water into pan from the top of the pan. Observe.

Step 2: Write your observations here.

Step 3: Look at the picture of the beach. How is the formation of the beach in the picture related to what happened to the sand in your pan?

Part B

Step 1: Very slowly pour one cup of water on to the sand blob in the pan. Observe.

Step 2: Write your observations here.

Step 3: Look at the picture of part of the Pictured Rocks Cliffs. How is the shape of these cliffs related to what happened to the blob in your pan?

Based on these activities, what force of change is being described?

INVESTIGATION 2: DIRECTIONS AND DATA SHEET

Materials Needed: ice block, ice cube, tray with gravel in it, sample with magnifying lens, 3 animal pictures

Part A:

Step 1: Put ice block in one end of tray with gravel bottom. Push down slightly on block and slide it to middle of tray. Lift up block and put cube under. Push down with the block then slide the block back to starting position. Observe what happened.

Explain how this is an example of something that has occurred in the this area in the past.

Part B:

Step 1: Carefully examine the white object with your eyes and a hand lens. Look for clues to determine what it is.

Step 2: Compare the object to the 3 pictures of animals.

Step 3: State which of the pictures you think your object used to be and explain why you think so.

Step 4: Look at the pictures of areas which have 3 different climates. Which climate do you think your object lived in?

Step 5: Is this type of climate still in Michigan?

INVESTIGATION 3: DIRECTIONS AND DATA SHEET

Materials: teaspoon, baggie of sand, cup of water, four drawings of the same lake over time,

Part A:

Step 1: Slowly add teaspoons of sand into cup of water. Each teaspoon represents the passage of ten years. Observe.

Step 2: Write down your observations.

Part B:

Step 1: Look at four drawings of the same lake. These represent four changes in the lake that will occur in 200 years. Write down the succession (or order of changes) that will happen to the lake from the first stage to the last stage. Write down the letters from first to last of the drawings labeled "E" "M" "T" and "I".

Step 2: How is the experiment with the sand and water related to changes that can occur in a lake?

Part C:

Step 1: Lakes, just like people are born and eventually die. Based on the above two activities explain the following statement: **"ALL LAKES ARE DYING"**

Review each investigation. What process of change does each represent? (change by water erosion, change due to climate, change due to aging)

View brief videotape to reinforce understandings of these.

Do you know when the glaciers covered this area or when warm shallow salty oceans covered the Upper Peninsula? You'll find out during the field trip to Pictured Rocks this winter. You'll also learn about other important periods of time and change our world has gone through.

MATERIALS:

- _____ picture of bristlecone pine
- _____ video of shape shifter
- _____ Investigation 1
 - ___ plastic trays with sand in bottom (2)
 - ___ pictures of beach/dunes (2)
 - ___ metal moonshine cups (2)
 - ___ sand blobs per class (3)
- _____ Investigation 2
 - ___ plastic trays with sand in bottom, 3" deep (2)
 - ___ ice blocks per class (2)
 - ___ ice cubes per class (2)
 - ___ pieces of petoskey stone (2)
 - ___ animal pictures (6): ___ condor ___ monkey ___ bear
 - ___ ecosystem pictures (6): ___ reef ___ rain forest ___ forest
- _____ Investigation 3
 - ___ teaspoons (2)
 - ___ baggies sand per class (2)
 - ___ clear cups with water (2)
 - ___ drawings of same lake - 2 sets (4)

WINTER 6TH GRADE FIELD TRIP ACTIVITIES 2000

"TIME CAPSULES" CONCEPT: CHANGE

MICHIGAN SCIENCE OBJECTIVES: At the end of this lesson, students will be able to:

1. Explain how the Pictured Rocks cliffs were formed.
(*Geosphere 10*)
2. Explain one way humans are altering the environment which will be evident to future archeologists (decline of number of species). (*Ecosystem 11*)
3. Explain how behavior of organisms help them to survive the changes brought on by a winter environment. (*Evolution 2*)
4. Explain likely changes to the Pictured Rocks area over time.
(*Ecosystem 9*)

GOALS: Students will understand that everything changes over time, the struggle to survive change is the struggle to live and humans can cause far reaching change in our natural world.

MATERIALS NEEDED:

_____brown stick of specks
_____treasure maps, laminated (5)
_____wooden time capsules with ingredients (9)
_____black box time capsules with ingredients (9)
_____snowshoes
_____time room bookcase with posters (9)
_____2' X 1' X 1' wooden boxes (6)
_____snow type scavenger hunt cards, laminated (16)
_____grease pencils (6)
_____dunes poster handouts

"Welcome to PICTURED ROCKS, intro's, rest room. Today we will continue our study of change in the natural world. It is a vital concept for our survival if something cannot adapt to a change in their world they will perish."

"We are going to work in two groups and do two different sets of activities. Each activity will take about an hour. Group A will stay inside for a minute to prepare for the hunt for the buried "time capsules". Group B will travel by snowshoe to an area to learn about Eskimo Snow. Does everyone have snow boots, hat and gloves?" Group B heads outside.

GROUP A: (one hour)

"Things are not always as they appear now as you will soon find out. In fact, this place right here has not always looked like it does now. It was very different in the past. Many people don't realize how everything is always changing, and that is an important concept. People in the future should know what the past was like."

(Hey what's that brown speck on your forehead?)

"Oh that. That's a speck of soil that was part of the cereal I ate for breakfast. You see, the flow of energy and the cycling of materials (like this soil speck) are what changes everything."

"Since I think you already know about the flow of energy and the cycling of matter, I would like you to use your knowledge to find out about past changes. A wizard made up nine time capsules (containers with objects and pictures showing what it was like in the past) and buried them near here. Here's a map he left for us."

"On this map there are x's indicating the locations of the buried time capsules. Each group of two or three gets to pick an x and head out to dig it up."

Head outside. Rest rooms. Don snowshoes and head for treasures!

Back Inside:

Each group must now visit the "Time Room". Each group must first match up the objects and pictures in their capsules with one of the murals. When they find the mural that shows the past era represented by their capsule items, they should look for a small logo in a lower corner of the mural. Next they have to find that same logo on a "Time Shelf" in the bookcase. When they do they discover how long ago things were like what the present mural shows (the date in years before now is written on the back of the bookcase right behind their shelf - like 20,000 years ago). The back is also painted to look like a soil profile, the wall of an excavation at the top and gradually changing to bedrock layers further down. Other items can be seen "buried" there.

When all groups have placed their objects on the shelves present a summary of the time period stories. Beginning with the bottom shelf -- 3.5 billion years ago -- describe a time when there was no life at all; the whole world was water with volcanoes spewing out molten rock that cooled to form the first land surfaces. Most of this time period is buried under sediment accumulated

over billions of years, but in the U.P. the glaciers exposed some of it as they scraped the land. In fact, Presque Isle in Marquette is a great place to see this ancient lava. Point out that one of the volcanic rocks on the shelf has a brown spot on it just like on my forehead.

"This soil speck can be traced on its journey through time as each shelf is described and the speck pointed out in a different object. It soon becomes apparent that the soil speck that began in volcanic rock 3.5 billion years ago is now a part of me! It's been recycled, used over and over through time, as parts of many different things."

"On the top of the bookcase is a model of the building we're in. The nine shelves below appear as layers underground."

Put another shelf over the top of the house model. "Someday people from the future might dig down and find things from today. I wonder what the future might be like up here? Will there be fewer plants and animals because we're changing things too fast today?"

"Most changes on earth take a very long time. But humans are changing things so fast, many plants and animals won't have a place to live in the future. Look out the bus window as you leave today. See all the new houses built along the shore. Without parks, very little shoreline will be left for wildlife up here. How about at your house or backyard. Humans seem to be against changes in nature in favor of their own. Do you stop natural changes by mowing your lawn or spraying herbicides on it. Your lawn is just is trying to change into a field and then a forest, which would be a home again for a lot of other creatures."

"Some scientists think the dinosaurs may have disappeared because an asteroid struck the earth, creating a gigantic cloud of dust that blocked out the sun causing the plants the dinosaurs depended on to die. Will our pollution of the earth's atmosphere with carbon dioxide and deadly chemicals like PCB's and mercury cause similar problems for living things tomorrow? **THINK ABOUT IT!**"

GROUP B:

"We're going to think like eskimos and learn about the different names for snow and why they had them. We are first going on a snow scavenger hunt. Working in groups as we hike along to the frozen pond I would like you to try to find as many different types of snow as listed on your scavenger hunt card. Put a check

mark by each kind you find. On the way back we will try to stop and look at different snow types, how they were formed and why it was important for eskimos to know about them."

At the pond students find holes that have already been drilled through the ice. They will again work in groups to first predict (1) temperature under the ice, then (2) dissolved oxygen level under the ice. Next they will test for these and analyze how snow or ice could change life for species of the pond.

A sample is dredged up from the pond bottom for the students to look at. They are asked where the stuff came from and how this accumulation could change the pond in the future. Point out marsh grasses along edge of pond which borders forest. Ask if marsh grass area will ever change someday What do they think it will change into?

On the way back from the pond, student are asked to identify places where they located different types of snow or snow features.

POST-TRIP ACTIVITY AND EVALUATION:

"Today we have observed many different examples of change that have occurred in this area over time and are occurring right now before your eyes."

"At this time I would like you to complete the POST-TEST. Please use examples that you have learned about today to answer the question."

DISCUSS changes that have shaped Pictured Rocks National Lakeshore and how pond and forest succession is still occurring along with erosion which will continue to change the area.

"CHANGE is a vital part of the natural world. Is it wise for us to try to stop the inevitable? Should we try to 'go with the flow' of change and plan for it or ignore it?"

"As responsible "resource keepers" we should all try to bring about positive changes in the environment and the way we live within that environment. That is we can do things to prevent unnecessary harmful changes to our natural resources and creatures that share them with us. A follow-up activity will explain this in more detail."

"As President Clinton frequently discusses, we must not be afraid of change but embrace it and use it to help improve our world. Please help bring about good changes in our world. The future is in your hands! THANK YOU and GOODBYE!"

FOLLOW UP ACTIVITY - WINTER 6TH GRADE- 2000

CONCEPT: CHANGE

Knowing a science concept is important. Knowing how to use the concept in your life is also important. By living according to natural science concepts you can help conserve valuable natural resources we all depend on!

JUSTICE WILLIAM O. DOUGLAS said, "I hope to be remembered as someone who made the earth a little more beautiful."

All of us have some habits or things we do which can harm the environment needlessly. To earn a Pictured Rocks National Lakeshore "Resource Keeper" glass bead and wristband (which shows you understand the concept of change and are willing to help protect it), please do the following activities.

1. LIST SOME THINGS YOU DO THAT COULD NEEDLESSLY HARM THE ENVIRONMENT! One hint: Try looking at some of the products you buy. Do they cause any problems for the environment in their production, packaging or use?

2. CHOOSE ONE HABIT, ACTION OR LIFESTYLE YOU HAVE AND CHANGE IT TO HELP THE ENVIRONMENT. DESCRIBE WHAT YOU DID BELOW AND HOW IT WILL HELP PROTECT OUR NATURAL RESOURCES. (Please do not use the example I will stop littering or polluting - be specific and use another example!

Next, have your parent or guardian sign this form and return it to your teacher. A "Resource Keeper Bead" indicating your understanding of this important concept will be sent to you.

Name _____ Date _____

School _____ Teacher _____

Parent/Guardian Signature _____